REMARKS

Claims 1-36 are pending in the above-identified application. Claims 1-36 were rejected. With this Amendment, claims 1 and 2, 14, 24, and 30 were amended. Applicants maintain that no new matter has been added. Accordingly, claims 1-36 are at issue in the above-identified application.

Applicants would like to thank Examiners Cuevas and Ponomarenko for their helpful and courteous discussion held with Applicants' representative on October 15, 2003. During this discussion, it was agreed upon to amend the pre-amble of independent claims 1, 14, 24, and 30 to include language that further clarifies the claims. As a result, Applicants have amended the pre-amble of claims 1, 14, 24, and 30 to include language that includes the words "electrical component" and "generating energy," as shown above. Applicants maintain that new new matter has been added with these amendments.

The present invention generally relates to methods and apparatuses for dissipating heat away from devices generating heat. In addition, the invention relates to methods and other apparatuses for converting heat energy into other forms of energy.

The research and development of liquid metal magneto hydro dynamic energy conversion systems has gained increased attention. However, since the thermo dynamic availability of a solid or fluid increases strongly with absolute temperature, efficient electrical power generation from a heat source is usually performed at elevated temperatures often in the range of 600° to 800° C. Alternatively, lower temperature equipment operating between 100° and 200° C have been developed to recover energy from solar concentrated heat fluids and geothermal sources. One approach uses a gas injected into a liquid metal which reduces the density of the liquid metal and causes an increased convection flow of the liquid metal within a channel. However,

one problem associated with this approach is that a pump may be required to circulate the liquid metal through the channel. This additional pump not only adds components to the system and requires maintenance, but also consumes electrical power and generates noise. Applicants have discovered that by providing a fluid conduit thermally connected to an electrical component and an energy converter operatively connected to the fluid conduit, it is possible to generate energy in response to a flow of fluid within the fluid conduit.

Claim Rejections - 35 USC § 103

Claims 1-5, 8-19, 21-23, and 30-36 are rejected under 35 U.S.C. § 103(a) as being unpatentable over *R. C. Chu et al.* (U.S. Patent No. 3,609,991) in view of *Bervig* (U.S. Patent No. 4,392,062). Applicants respectively traverse this rejection.

R. C. Chu et al. discloses a number of multi-chip modules, units or packages 10 which may be adapted for plugging into a circuit board 12 or alike. (See *R. C. Chu et al.*, column 3, lines 7-10). An electronic chip 14, having stud 16 connected thereto which extends into a chamber 18, forms a part of each module or package 10. (See *R. C. Chu et al.*, column 3, lines 10-20). The chamber 18 has a bottom inlet 20 and a top outlet 22 so that fluid can be circulated therethrough. (See *R. C. Chu et al.*, column 3, lines 20-23). The bottom inlet 20 of each modules connected to a bottom outlet 21 of a coolant fluid reservoir 24 by a connecting hose 26. (See *R. C. Chu et al.*, column 3, lines 23-25). Likewise, the top outlet 22 of the modules 10 is connected to an inlet 23 of the same coolant fluid reservoir 24 above the level of the coolant fluid 28 by similar connecting hose 30. (See *R. C. Chu et al.*, column 3, lines 25-28).

Bervig discloses a fluid dynamic energy storage and production device 1. (See *Bervig*, column 6, lines 46-47). The device 1 includes a conduit, U-tube, or loop 10 adapted to receive and hold a fluid 12 therein. The loop 10 comprises an elongate and substantially vertically

aligned downcomer leg 15 and an elongate riser leg 16 interconnected near the bottoms thereof by suitable piping 18 which conducts fluid flow of fluid 12 from the downcomer leg 15 to riser leg 16 through an electrical generator 19 comprising an hydroelectric-type turbine 20 in combination with a generation unit 21 for producing electricity. (See *Bervig*, column 6, lines 63 to column 7, line 3).

Amended claim 1, from which claims 2-5 and 8-13 depend, recites a heat dissipating device for dissipating heat from an electrical component and for generating energy, comprising a fluid conduit configured to channel a fluid therethrough, the fluid conduit being thermally connected to an electrical component capable of generating heat to cause the fluid to flow through the fluid conduit. Claim 1 further recites a heat exchanger operatively positioned between the electrical component and the fluid conduit, and an energy converter operatively coupled to the fluid conduit that generates energy in response to the flow of fluid. Amended claim 14 from which claims 15-19 and 21-23 depend, recites a fluid conduit and an energy converter operatively connected to the fluid conduit to generate energy in response to a fluid flow. Claim 14 further recites a volatile fluid being an immersed in the fluid wherein the volatile fluid has a lower boiling point than the fluid. While *R. C. Chu et al.* teaches a cooling system having thermally induced circulation, *R. C. Chu et al.* does not disclose at least one energy converter operatively associated with the at least one fluid conduit to generate electricity from a fluid flow. *Bervig* teaches a fluid dynamic energy storage and production device 1. There is no motivation or suggestion to combine the device taught in *Bervig*, which is generally used for storing power from an electrical grid system during periods of low consumption (*See Bervig*, column 2, lines 49-52), with the device taught in *R. C. Chu et al.*, that is, a cooling system for modular package electronic components. Additionally, there is no indication that the once

combined, the device taught in *Bervig* would operate in a manner so as to generate energy from the flow of liquid that is disclosed in the device taught in *R. C. Chu et al.* Accordingly, Applicants submit that claims 1-5, 8-19, and 21-23 are not unpatentable over *R. C. Chu et al.* in view of *Bervig*, either alone or in combination.

Claim 30, from which claims 31-36 depend, recites a method of dissipating heat from an electrical component and for generating energy comprising channeling a fluid through a fluid conduit, differentiating the density of the fluid by thermally connecting the fluid conduit to an electrical component generating heat causing the fluid to flow by convection through the fluid conduit, dissipating heat from the fluid for maintaining the differential of the density, transferring the energy to an electrical storage, an generating energy by directing the fluid through an energy converter. For the same reasons as stated above, Applicants submit that claims 30-36 are not unpatentable over *R. C. Chu et al.* in view of *Bervig*, either alone or in combination.

Claims 6, 7, 20, and 24-29 were rejected under 35 U.S.C. 103(a) as being unpatentable over *R.C. Chu et al.* in view of *Bervig* as applied to claim 1-5, 8-19, 21-23, and 30-36 above, and further in view of *Burward-Hoy* (U.S. Patent No. 5,441,102). Applicants respectively traverse this rejection. Claim 6 requires of the energy converter be a liquid magneto hydro generator. None of the above-cited references teach or disclose a liquid magneto hydro generator. Claims 7, 20, 24-29 all require an energy converter that includes a first electrode, a second electrode and a permanent magnet centrally displaced between them. None of the above-cited references teach or disclose an energy converter that includes a first electrode, a second electrode and a permanent magnet displaced between them. Accordingly, Applicants submit that claims 6, 7, 20,

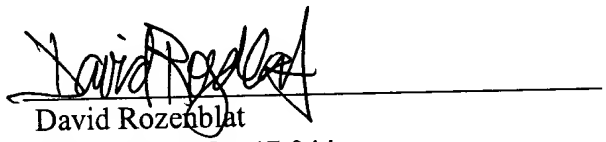
and 24-29 are not unpatentable over *R. C. Chu et al.* in view of *Bervig* and further in view of *Burward-Hoy*, either alone or in combination.

CONCLUSION

In view of the remarks set forth above, Applicant respectfully submits that the present invention is in condition for allowance. Early notification to such effect is earnestly solicited. Should the Examiner have any remaining issue, Applicant kindly requests that the Examiner contact the undersigned.

Respectfully submitted,

Dated: October 17, 2003

By: 

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